

Application No. 10/694,433
Amendment and Response to First Office Action mailed June 25, 2004

REMARKS

A. Background

The present amendment is filed in response to the Examiner's Office Action mailed June 25, 2004. Claims 1-34 were pending. Claims 11 and 12 are canceled. Claims 1, 10, 13, 14, and 27 are amended. New claims 35 and 36 are added. Claims 1-10 and 13-36 are now pending in view of the above amendments.

Reconsideration is respectfully requested in view of the above amendments and following remarks. For the Examiner's convenience and reference, Applicant's remarks are presented in the order in which the corresponding issues were raised in the Office Action.

B. Rejections Under 35 U.S.C. § 102

The Examiner rejects claims 1, 5, 9, 10, 12, and 13 under 35 U.S.C. § 102(c) as being anticipated by U.S. Patent Application Publication No. US2003/0169787 A1 to Vurgafman, *et al.* ("*Vurgafman*"). However, as will be seen below, *Vurgafman* fails to teach or suggest each and every element of the pending claims, and thus does not anticipate the present invention.

Vurgafman discloses a photonic crystal-based distributed feedback/distributed bragg-reflector laser. In particular, and as shown in Figure 1, in one embodiment *Vurgafman* discloses a DFB laser 10 having front and rear facets 18 and 20 between which extends a gain stripe 26 for producing a laser output beam 22. Also included in the laser is a plurality of grating features 24 that form a lattice structure. Both the grating features 24 and the gain stripe 26 are angled with respect to the facets 18 and 20. As explicitly discussed by *Vurgafman*, the lattice structure formed by the grating features 24 is a two-dimensional structure having a first lattice period Λ_1 14 in the x-axis direction, and a second lattice period Λ_2 16 in the z-axis direction. See *Vurgafman*, Figure 1; ¶s 41-43.

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The claimed invention is patentably distinct from the device taught by *Vurgafman*. In particular, amended independent claim 1 requires the presence, in a distributed feedback laser, of a die having a front and rear facet, a laser stripe "tilted at an angle relative to at least one of said front cleaved facet and said rear cleaved facet," and "a *one-dimensional grating* mounted on said die approximately perpendicular to and optically coupled to said laser stripe." *Vurgafman* teaches no such structure. Indeed, in contrast to the present invention, *Vurgafman* discloses lasers having *two-dimensional* grating structures. For instance, *Vurgafman* describes the grating features of the laser shown in Figure 1 as being two-dimensional, in order to create two lattice periods: "The periods, Λ_1 (14) and Λ_2 (16) are representative of the spacing between the grating features 24 along the x-axis (Λ_1) and the z-axis (Λ_2)." *Vurgafman*, ¶41. The other embodiments of *Vurgafman* employ similar lattice structures for defining two-dimensional gratings. See, e.g., *Vurgafman*, ¶s 110, 111 (describing a laser in Figure 8 having a first grating 166 and a second grating 168 that define a two-dimensional grating lattice¹); ¶ 132 (describing another laser embodiment shown in Figure 12, wherein a two-dimensional grating pattern is formed by gratings 210 and 208). Therefore, *Vurgafman* fails to teach or suggest each and every element of amended claim 1, and therefore fails to anticipate that claim. Thus, Applicant submits that amended claim 1 is allowable in light of the cited art. Similarly, claims 2-9, which depend on claim 1, are also allowable. Allowance of these claims, together with claim 1, is therefore respectfully solicited.

Amended independent claim 10 is also patentably distinct from *Vurgafman* in that it teaches, in a method of fabricating a distributed feedback laser, "defining a *one-dimensional grating* at a selected misalignment angle with respect to said at least one cleavage plane." As

¹ Note that ¶ 114 of *Vurgafman* states that, in the embodiment shown in Figure 8, a "1D" grating 166 may be employed in the second tuning section 158, rather than the "2D" grating comprising gratings 166 and 168, as shown in the figure. However, if this is done, anticipation of the present claimed invention still does not result, as the laser would fail to teach "a one-dimensional grating mounted on said die approximately *perpendicular to* and optically coupled to said laser stripe," required by claim 1, as the 1D grating 166 is parallel to the laser stripe.

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was discussed above, *Vurgafman* fails to teach such a limitation. Therefore, claim 10 is also allowable in light of the cited art, as are claims 13-26, which depend therefrom. As such, Applicant respectfully solicits the removal of the rejection to claims 1, 5, 9, 10, 12, and 13 under Section 102 and requests the allowance thereof.

C. Rejections Under 35 U.S.C. § 103

The Examiner rejects claims 2-4, 6-8, 11-12, 14-24, and 26-34 under 35 U.S.C. § 103(a) as being unpatentable over *Vurgafman*. However, as will be shown, *Vurgafman* fails to teach or suggest each of the elements of the present claimed invention, and therefore does not make obvious the present claimed invention.

With respect to claims 2-4, 6-8, 11-12, and 14-24, and 26, Applicant notes that claims 11 and 12 are canceled and that each of the remaining claims are dependent upon one of the independent claims 1 and 10. Applicant further notes that the rejection of each of these claims is based on the *Vurgafman* reference. As described above, Applicant submits that independent claims 1 and 10 are allowable over *Vurgafman* for its failure to teach each and every limitation of those claims. Thus, Applicant submits that the claims at issue here are also allowable for at least the same reasons, that is, the failure of *Vurgafman* to teach not only the limitations contained in independent claims 1 and 10, but also the claim limitations contained in each of the dependent claims at issue here. Therefore, Applicant respectfully submits that these claims are also allowable over the cited art. Applicant therefore solicits removal of the rejection under Section 103 of claims 2-4, 6-8, 14-24, and 26, and requests the allowance thereof.

With respect to claims 27-34, Applicant contends that these claims are also allowable over the cited art. In particular, amended independent claim 27 discloses a method of improving a yield of distributed feedback lasers, and requires forming a plurality of DFB lasers, wherein

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each laser has a laser stripe that is oriented at an angle within a range of angles with respect to cleaved front and rear facets of each laser, and wherein each laser further includes "a *one-dimensional grating* perpendicular to said laser stripe." As has been previously discussed, *Vurgafman* fails to teach or suggest a laser having such a grating structure. Thus, the Office Action has failed to make out a *prima facie* case of obviousness by the failure of *Vurgafman* to teach or suggest each and every element of amended independent claim 27. Thus this claim, along with claims 28-34 that depend therefrom, is allowable and Applicant respectfully solicits removal of the rejection to these claims under Section 103.

The Office Action also rejects claim 25 under 35 U.S.C. § 103(a) as being unpatentable over *Vurgafman* in view of U.S. Patent Application Publication 2002/0131465 A1 to Lowe, *et al.* ("*Lowe*"). As has already been discussed, amended independent claim 10, from which claim 25 depends, is allowable over the cited art. Correspondingly, Applicant solicits that claim 25 is therefore also allowable over the prior art, and respectfully solicits removal of the rejection to this claim under Section 103.

D. New Claims

Applicant submits that new claims 35 and 36 are allowable in light of the cited references. In detail, now claim 35 discloses a distributed feedback laser system, including "a plurality of one-dimensional gratings formed on [a] substrate bar," and a laser stripe that is angled with respect to at least one of a front facet and a rear facet. Similarly, new claim 36 discloses a distributed feedback laser system, including "a one-dimensional grating" formed on a laser die, and a laser stripe formed on the laser die that is angled with respect to at least one of a front facet and a rear facet. As has already been described above, these features are neither

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taught nor suggested by the references cited in the Office Action. Thus, new claims 35 and 36 are allowable, and Applicant requests that such allowance be entered.

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CONCLUSION

In view of the discussion and amendments submitted herein, Applicant respectfully submits that each of the pending claims 1-10 and 13-36 is now in condition for allowance and that all objections to the application have been resolved. Therefore, reconsideration of the rejections is requested and allowance of those claims is respectfully solicited. In the event that the Examiner finds any remaining impediment to a prompt allowance of this application that can be clarified in a telephonic interview, the Examiner is respectfully requested to initiate the same with the undersigned attorney.

Dated this ____ day of August, 2004.

Respectfully submitted,

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